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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/539,719	06/20/2005	Haruo Sakagoshi	5271-0112PUS1	5004

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EXAMINER
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HAN, KWANG S

ART UNIT	PAPER NUMBER
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1795

NOTIFICATION DATE	DELIVERY MODE
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05/01/2009

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/539,719	<b>Applicant(s)</b> SAKAGOSHI ET AL.	
	<b>Examiner</b> Kwang Han	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 09 April 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) 7-12 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 13-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 June 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/20/05, 8/16/05, 3/28/07, 7/26/07, 8/13/07</u> .             | 6) <input type="checkbox"/> Other: _____                          |



**NEGATIVE ELECTRODE FOR LITHIUM SECONDARY BATTERY, METHOD FOR  
PRODUCING SAME, AND LITHIUM SECONDARY BATTERY USING SAME**

Examiner: K. Han    SN: 10/539,719    Art Unit: 1795    April 29, 2009

***Election/Restrictions***

1.     Applicant's election without traverse of Group I, claims 1-6 and 13-18 in the reply filed on April 9, 2009 is acknowledged.
  
2.     Claims 7-12 withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim.

***Priority***

3.     Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

***Information Disclosure Statement***

4.     The information disclosure statement filed August 13, 2007 fails to comply with 37 CFR 1.98(a)(3) because it does not include a concise explanation of the relevance, as it is presently understood by the individual designated in 37 CFR 1.56(c) most knowledgeable about the content of the information, of each patent listed that is not in the English language. It has been placed in the application file, but the information

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referred to therein has not been considered. Reference KR 2001-0031769 has no english translation or explanation of relevance.

### ***Specification***

5. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 1, 6, 13, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taniguchi et al. (JP 2001-135304, machine translation) in view of Moriguchi et al. (US 6576369).

Regarding claim 1, Taniguchi discloses a lithium ion secondary battery which is comprised of cylindrical (spherical) graphite carbon fibers with diameters from 5 to 50 microns, and scale-like (flat) graphite powder from 0.1 to 30 microns [Abstract] but is silent towards the sizes of the crystallites of the graphite and the tap density.

Moriguchi teaches a graphite powder suitable for a negative electrode material for a lithium ion secondary battery comprised of graphite powder having a crystallite diameter in the c-axis smaller than 100 nm and tap density of the graphite to be greater than  $1.0 \text{ g/cm}^3$  (Column 8, Lines 23-34; Columns 25-26) for the benefit of forming a lithium ion secondary battery with high discharge capacity and high charge/discharge coulombic efficiency [Abstract]. It would have been obvious to one of ordinary skill in the art at the time of the invention to have a crystallite diameter in the c-axis and a tap density to be greater than  $1.0 \text{ g/cm}^3$  for the graphite particles of Taniguchi because Moriguchi teaches this forms a lithium ion secondary battery with high discharge capacity and high charge/discharge coulombic efficiency.

Regarding claim 6, Taniguchi discloses a ratio of the scale like graphite powder in the mixed composite is from 20 to 50 weight percent of the mixed composite [Abstract].

Regarding claim 13, Taniguchi discloses a lithium ion secondary battery which is comprised of a positive electrode, electrolyte [0030], a negative electrode with a binder further comprised of cylindrical (spherical) graphite carbon fibers with diameters from 5 to 50 microns, and scale-like (flat) graphite powder from 0.1 to 30 microns [Abstract] but is silent towards the sizes of the crystallites of the graphite and the tap density.

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Moriguchi teaches a graphite powder suitable for a negative electrode material for a lithium ion secondary battery comprised of graphite powder having a crystallite diameter in the c-axis smaller than 100 nm and tap density of the graphite to be greater than  $1.0 \text{ g/cm}^3$  (Column 8, Lines 23-34; Columns 25-26) for the benefit of forming a lithium ion secondary battery with high discharge capacity and high charge/discharge coulombic efficiency [Abstract]. It would have been obvious to one of ordinary skill in the art at the time of the invention to have a crystallite diameter in the c-axis and a tap density to be greater than  $1.0 \text{ g/cm}^3$  for the graphite particles of Taniguchi because Moriguchi teaches this forms a lithium ion secondary battery with high discharge capacity and high charge/discharge coulombic efficiency.

Regarding claim 18, Taniguchi discloses a ratio of the scale like graphite powder in the mixed composite is from 20 to 50 weight percent of the mixed composite [Abstract].

9. Claims 2 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taniguchi et al. and Moriguchi et al. as applied to claims 1 and 13 above, and further in view of Mabuchi et al. (US 6156432).

The teachings of Taniguchi and Moriguchi as discussed above are herein incorporated.

Regarding claims 2 and 14, Taniguchi and Moriguchi are silent towards the graphite particles where the surface of the graphite is covered with non-graphite carbon.

Mabuchi teaches a carbon material for a negative electrode of a secondary lithium battery formed by coating the graphite material with a low-crystalline carbon to stop the decomposition of the electrolyte solution, destruction of the negative electrode, and show a high value of charge/discharge efficiency (6:35-46). It would have been obvious to one of ordinary skill in the art at the time of the invention to coat the graphite material of Taniguchi and Moriguchi because Mabuchi teaches this stops decomposition of the electrolyte solution, destruction of the negative electrode, and shows a high value of charge/discharge efficiency.

10. Claims 6 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taniguchi et al. and Moriguchi et al. as applied to claims 1 and 13 above, and further in view of Koyama et al. (US 2004/0101756).

Regarding claims 6 and 18, the teachings of Taniguchi and Morguchi as discussed above are herein incorporated.

Koyama teaches a negative electrode for a secondary battery which uses an aqueous resin binder and a rubber based resin in mixtures [0034-0035] for the benefit of having a larger binding effect than solvent type binders and increase the ratio of the active material in the same volume [0008]. It would have been obvious one of ordinary skill in the art at the time of the invention to use an aqueous and a rubber based binder in the negative electrode of Taniguchi and Morguchi because Koyama teaches these binders have a larger binding effect and increase the ratio of active material.



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11. Claims 4 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taniguchi et al. and Morguchi et al. as applied to claims 1 and 13 above, and further in view of Sheem et al. (US 2004/0214087).

Regarding claims 4 and 16, the teachings of Taniguchi and Morguchi as discussed above are herein incorporated. Taniguchi and Morguchi are silent as to the binding or agglomeration of the graphite particle to form a secondary particle.

Sheem teaches a negative active material for a rechargeable lithium battery which is produced by agglomerating a carbon material to form a secondary particle which has a core for the benefit of providing a negative active material which can prevent side reactions during charge/discharge and exhibit good reversible capacity and low irreversible capacity [0013, 0035, 0036]. It would have been obvious to one of ordinary skill in the art at the time of the invention to form a secondary particle from the graphite of Taniguchi and Morguchi because Sheem teaches this process forms negative active material which has a core to prevent side reactions during charge/discharge and exhibit good reversible capacity and low irreversible capacity.

12. Claims 3 and 15 rejected under 35 U.S.C. 103(a) as being unpatentable over Taniguchi et al. and Morguchi et al. as applied to claims 1 and 13 above, and further in view of Takami et al. (US 5312611).

Regarding claims 3 and 15, the teachings of Taniguchi and Morguchi as discussed above are herein incorporated. Taniguchi and Morguchi are silent as to the Raman intensity of the negative electrode materials.

Takami teaches a lithium secondary battery with a carbonaceous material for the negative electrode which exhibits a Raman spectrum with an argon laser having a peak resulting from the turbulence structure appearing at about  $1360\text{ cm}^{-1}$  and a peak from the graphite like structure appearing at about  $1580\text{ cm}^{-1}$  and having an  $R_1/R_2$  range between 0.5-1.5 for a suitable negative electrode material (4:7-22). Takami further teaches if the ratio falls below 0.5, decomposition of the solvent in the electrolyte occurs and if the ratio exceeds 1.5, the absorbing and releasing quantity of lithium ions in the negative electrode decreases (4:22-28). It would have been obvious to one of ordinary skill in the art at the time of the invention to have a Raman spectrum with an R value at 0.4 or larger because Takami teaches optimization of this value allows for minimal decomposition of the solvent and increasing the absorbing/releasing quantity of lithium ions.

#### ***Contact/Correspondence Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kwang Han whose telephone number is (571) 270-5264. The examiner can normally be reached on Monday through Friday 8:00am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on (571) 272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. H./  
Examiner, Art Unit 1795

/Dah-Wei D. Yuan/  
Supervisory Patent Examiner, Art Unit 1795